DEVELOPMENT OF WATER-TABLE AND DEPTH TO WATER MAPS FOR THE SOUTHEASTERN UNITED STATES USING A GEOGRAPHIC INFORMATION SYSTEM

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Depth to water and the configuration of the water table are controlling factors for the U.S. Environmental Protection Agency's (EPA) DRASTIC and Hazard Ranking System (HRS) programs which are used to determine the vulnerability of aquifers to contamination from surface sources. For this reason, the EPA has developed a computerized data base for the southeastern United States by using data derived from an earlier evaluation of aquifer vulnerability to pesticide contamination that used DRASTIC. Further refinement of the data base is needed to accurately assess groundwater vulnerability.

As part of this refinement, a map showing an approximation of annual mean depth to ground water and the altitude of water table across the southeastern United States was generated by using a Geographic Information System (GIS) and water-level data from a variety of sources. GIS is a computerized cartographic system that organizes geographic data. The system facilitates efficient handling of locational data describing the location of point, line, and area features, and attribute data describing the characteristics of those features. Water-levels, land-surface altitudes, and well-construction data stored in the National Water Information System (NWIS) of the U.S. Geological Survey were compiled for more than 16,000 wells. Wells selected from NWIS were limited to those less than 100 feet deep because they were assumed to represent unconfined or semiconfined conditions. In Georgia, data from 486 wells was used in this analysis (fig. 1).

Additional water-table data for the Coastal Plain were obtained from data sets assembled for ground-water-flow models as part of the USGS's Regional Aquifer Systems Analysis (RASA) studies of the Gulf Coast (Williams and Williamson, 1989), Atlantic Coast (G.L. Gisse, U.S. Geological Survey, written commun., 1988), and Floridan aquifer systems (Krause and Randolph, 1989; Tibbals, 1989). The RASA-model data coverage for Georgia and adjacent parts of Alabama, South Carolina, and Florida are shown in figure 2. The RASA data was combined with the NWIS data to provide a composite coverage of the altitude of the water-table surface. Water-table altitudes on this map then were subtracted from land-surface altitude data obtained from NWIS to generate a map showing the approximate depth to water. Data coverage and resolution of the water table generally was better in the Coastal Plain than in the other physiographic provinces, owing to the greater number of wells and the greater number of data used in the RASA models.

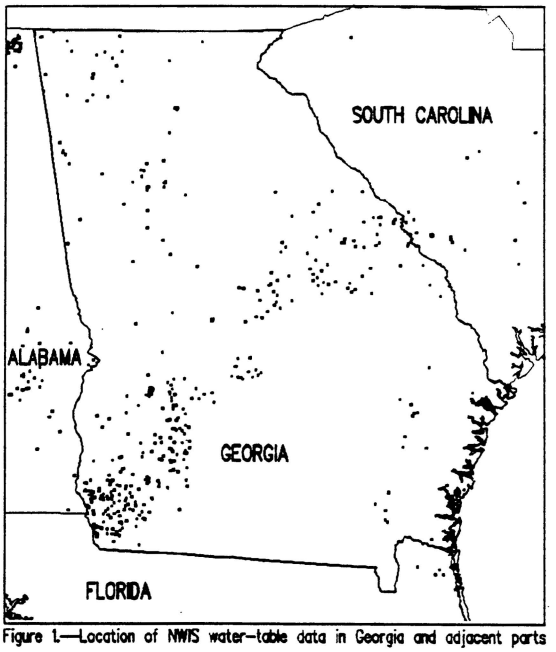

Figure 1.—Location of NWIS water-table data in Georgia and adjacent parts of Alabama, Florida, and South Carolina.

LITERATURE CITED

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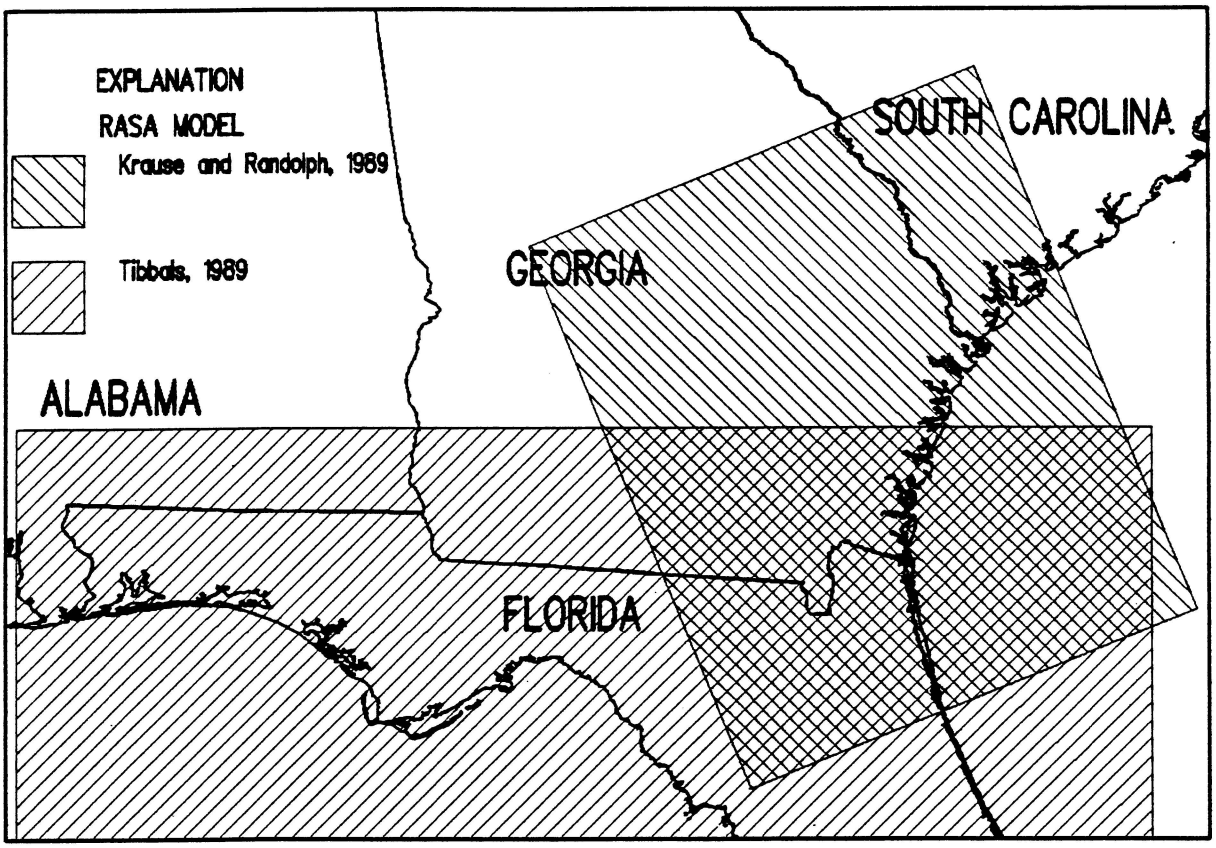

Figure 2.--RASA model water-table data in Georgia and adjacent parts of Alabama, Florida, and South Carolina.